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PROGRAM TITLE: SMOKE CONDENSATE STUDIES

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I. CONDENSATE PREPARATION

Whole smoke condensate (WSC) from selected cigarette types was processed on schedule for Project 6900. The WSC from all-Bright tobacco cigarettes containing the alkaloid-free hexane extractables from radioactive (^{14}C) Bright tobacco was processed.

II. CHEMICAL AND BIOLOGICAL ANALYSES

A. CHEMICAL ANALYSES

The study of chemical stability of WSC as a function of storage temperature and physical state was completed. In this experiment, it was concluded that the amounts of nicotine, phenols, total aldehydes and total nitriles do not change over a 53-day time interval. These chemical parameters are not affected by storage of WSC in acetone at 6°C or at -20°C.[2]

The gas chromatographic profiles of the petroleum ether extractables from TPM for cigarettes made by different reconstitution processes (TFP, Schweitzer and Rapaport) were obtained. With one exception, these profiles were similar, although minor to moderate differences in the ratios of several peaks were observed. The profile obtained from the TFP sample showed three major peaks which did not appear in the other profiles. The origin of these components is under investigation.[4]

The attempts to separate hydroxyacetone from dimethylnitrosamine on four different gas chromatographic columns were not successful. A smoke sample has been sent to the Department of Agriculture for high resolution mass spectrometric analysis for confirmation of the dimethylnitrosamine.[1]

The first attempt to quantify the dimethylnitrosamine (DMNA) resulted in the following observation: about four times as much DMNA is present in the dry ice/acetone trap as is found in the sodium hydroxide trap used to collect "fresh" smoke. This observation will be confirmed.[1]

A high speed liquid chromatographic separation scheme was developed using a Zorbax Sil column. This scheme separates the polynuclear aromatic hydrocarbons (PAH's) from other UV-absorbing compounds in fraction VI (Grimmer scheme).[5]

The separation efficiency of Sephadex LH-20 in both an analytical and preparative mode has been established for equivalent fractions of WSC from an expanded Bright tobacco cigarette and its control. This technique is successful in separating the terpenoids from the PAH's and degradation products of chlorinated pesticides.[1,3]

Work continues on the nitrogen profiles from selected cigarette types. These profiles are similar with the exception of that obtained from an LTF cigarette type. Current effort is directed toward the identification of these nitrogen-containing compounds.[6]

It was demonstrated that rechromatography of fraction VI (Grimmer scheme) on deactivated silica gel followed by preparative thin layer chromatography resulted in a gas chromatographic profile which yields nearly baseline separation of the majority of components in this subfraction.[1]

The Grimmer separation scheme was completed on WSC from all-Bright tobacco cigarettes containing not only the total hexane extractables from radioactive (^{14}C) Bright tobacco but also the radioactive hexane extractables minus the tobacco alkaloids. The mass distribution data from these two experiments were reasonably reproducible. The accountability of the radioactivity seemed reasonable; *i.e.*, the activity was reduced in the second experiment for those fractions known to contain the tobacco alkaloids. A special report covering the details of these experiments is being drafted.[2]

B. BIOLOGICAL ANALYSES

The study of stability of WSC in relation to its biological activity (E. coli procedure) through 53 days of storage was completed. According to the results of this bioassay it was concluded that there is no change in the activity of the WSC through the 25th day but the activity on all samples drops on the 39th day. The results on the 53rd day (termination date of the test) are unexplainable because all the test samples including the positive control were inactive.[2]

III. REFERENCES

1. N. Einolf 6368, 64
2. F. Gager 6448, 31
3. T. Katz 6127, 96
4. R. Levins 6440, 9
5. G. Smith 6414, 29
6. E. Trusdell 6231, 96

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